CLAIMS

1. Apparatus for the measurement of vascular impedance of the ocular micro circulation *in vivo*, comprising intra-ocular pressure measurement means from which a pressure pulse waveform is calculable, blood velocity profile measurement means for measuring the linear blood flow velocity in the retrobulbar circulation, and means for calculating a vascular impedance modulus from the pressure pulse waveform and the linear blood flow velocity.

2. Apparatus as claimed in claim 1, wherein the intra-ocular pressure measurement means is suitable for measuring the maximum and minimum pressure values of the pulse profile to calculate a mean intra-ocular pressure.

3. Apparatus as claimed in claim 1 or claim 2, suitable for measuring how the pressure pulse waveform and the linear blood flow velocity vary over the period of a respiratory cycle.

4. Apparatus as claimed in any preceding claim, wherein a solid state transducer is used to measure intra-ocular pressure.

5. Apparatus as claimed in claim 4, wherein a suitable solid state transducer operates in conjunction with a suitable telemetry system to process the data.

6. Apparatus as claimed in any of claims 1 to 3, wherein an ocular pneumotonometer is used to measure intra-ocular pressure.

7. Apparatus as claimed in any preceding claim, wherein the blood velocity profile measurement means is an ultrasound device.

8. Apparatus as claimed in claim 7, wherein the ultrasound device is a doppler ultrasound imager.

9. Apparatus as claimed in any preceding claim further comprising motion picture generation means to produce moving images of an artery.

10. Apparatus as claimed in claim 9, wherein the moving images are capable of being used to ensure that a user of the apparatus can accurately identify the location of an artery.

11. Apparatus as claimed in any preceding claim, wherein the change in the pulsatile intra-ocular pressure waveform and the linear blood flow velocity are measured sequentially.

12. Apparatus as claimed in any preceding claim, wherein the means for calculating the vascular impedance modulus comprises means for;

obtaining the fourier transform of the intra-ocular pressure pulse waveform and the linear blood flow velocity and dividing the transformed values of the pulsatile change in the intra-ocular pressure

pulse by the transformed retrobulbar blood flow velocity.

13. Apparatus as claimed in any preceding claim, wherein the pulsatile change in intra-ocular pressure has a phase associated therewith.

14. Apparatus as claimed in any preceding claim, wherein the intra-ocular blood velocity has a phase associated therewith.

15. A method for the measurement of vascular impedance of the ocular micro circulation *in vivo*, comprising the steps of: measuring the intra-ocular pressure pulse waveform of the ocular network; measuring the linear blood flow velocity in the retrobulbar circulation; and
calculating the vascular impedance modulus from the intra ocular pressure pulse waveform and the linear blood flow velocity waveform.

16. A method as claimed in claim 15, wherein the pressure pulse waveform and the linear blood flow velocity are measured over the period of a respiratory cycle, and their variation therewith is measured.

17. A method as claimed in claim 16, wherein the variations are used in the calculation of the vascular impedance modulus.

18. A method as claimed in any of claims 15 to 17, further comprising the steps of recording moving images of an artery.

19. A method as claimed in claim 18, wherein the moving images are used to accurately identify the location of an artery.

20. A method as claimed in any of claims 15 to 19, wherein the change in the pulsatile intra-ocular pressure waveform and the linear blood flow velocity are measured sequentially.

21. A method as claimed in any of claims 15 to 20, wherein the step of calculating the vascular impedance modulus comprises the steps of; obtaining the fourier transform of the intra-ocular pressure pulse waveform and the linear blood flow velocity and dividing the transformed values of the pulsatile change in the intra-ocular pressure pulse by the transformed retrobulbar blood flow velocity.